

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2001-177950

(43)Date of publication of application : 29.06.2001

(51)Int.Cl.

H02G 3/16  
B60R 16/02  
H01R 12/08  
H01R 13/514

(21)Application number : 11-351082

(71)Applicant : FURUKAWA ELECTRIC CO LTD:THE

(22)Date of filing : 10.12.1999

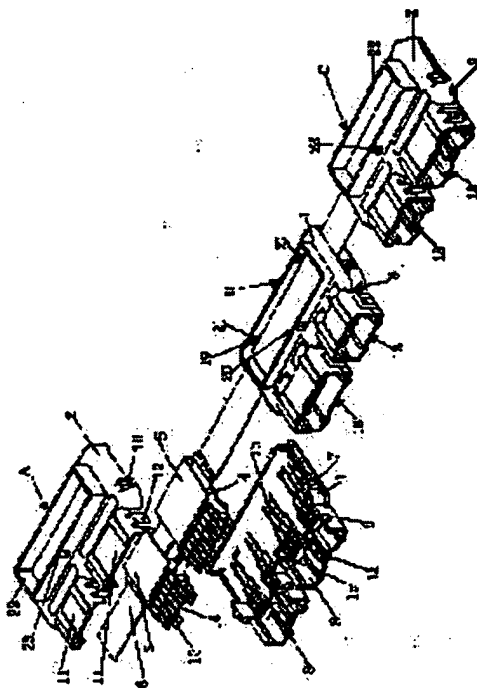
(72)Inventor : HIGASHIDA YASUSHI  
MIYAJIMA KAZUO

## (54) WIRING CONNECTION DEVICE

## (57)Abstract:

**PROBLEM TO BE SOLVED:** To provide a wiring connection device which can use an existing electrical junction box, even if a circuit structure is changed into a complex circuit structure, and can eliminate electrical junction box connection wiring harness, even if the number of electrical junction boxes is increased.

**SOLUTION:** This wiring connection device has a plurality of electrical junction boxes A, B and C, which have respectively hollow device bodies 3, internal flat cables 5, which are provided inside the device bodies and have connection terminals on tips thereof and extension flat cables 6, which are connected electrically to the internal flat cables 5 and extended out from the device bodies 3. The electrical junction boxes are connected electrically to each other with the extension flat cables 6.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the  
examiner's decision of rejection or application  
converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office

## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

## DETAILED DESCRIPTION

---

### [Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the wiring contact which connected electrically two or more electrical connection boxes, such as a relay box for connecting the wire harness for automobiles to electronic autoparts especially, a fuse box, and a junction box, about the wiring contact which connected two or more electrical connection boxes electrically.

[0002]

[Description of the Prior Art] An electrical connection box conventional bus bar laminating type carries out the laminating of two or more circuit boards which carried out the laminating of two or more bus bars on both sides of the electric insulating plate into the space formed between an upper case and a lower case in between, or really carried out the mould of the bus bar by the insulating resin, and is constituted as indicated by JP,54-168585,U, JP,55-12728,U, and JP,1-79325,U.

[0003] the conductor which a bus bar becomes from copper, a copper system alloy, etc. -- a plate is pierced with a press machine and it is formed The end-connection child formed at the nose of cam of a bus bar has projected from the side of an electric insulating plate etc. to the method of outside, and the circumference is covered with terminal housing. And as shown in drawing 9, the external connector 52 of two or more harnesses 51 is inserted into the terminal housing 50 of the electrical connection box D, and the end-connection child of the external connector 52 is connected to the end-connection child of the electrical connection box D.

[0004] Moreover, when the number of the harnesses 51 which constitute a circuit increases with a design change, the addition of a type of a car, etc., as shown in drawing 10, it corresponds by adding another electrical connection box E, inserting a harness 51 into the terminal housing 53, and connecting. In this case, in order to connect between the electrical connection boxes D and E electrically, the harness 55 for electrical connection box connection which equipped both ends with the connector area 54 is used.

[0005]

[Problem(s) to be Solved by the Invention] With an electrical connection box conventional bus bar laminating type, when it changes into complicated circuitry, with the existing electrical connection box, it cannot respond but the electrical connection box of new structure must be developed.

[0006] Moreover, if an electrical connection box increases, since the harness for electrical connection box connection which equipped both ends with the connector will be increment needed, the composition of an electrical connection box becomes complicated and a manufacturing cost is applied.

[0007] this invention is made in order to solve the above-mentioned technical problem, even if it changes it into complicated circuitry, it can respond with the existing electrical connection box, and even if an electrical connection box increases, it aims to let the harness for electrical connection box connection offer an unnecessary wiring contact.

[0008]

[Means for Solving the Problem] The wiring contact of this invention is formed in the interior of a main part and a main part in the air, it connects with the internal cable equipped with the end-connection child at the nose of cam, and its internal cable electrically, and it has two or more electrical connection boxes which have the cable extension prolonged in the aforementioned main part shell exterior, and is characterized by the aforementioned electrical connection boxes being electrically connected by the aforementioned cable extension.

[0009] To the same cable extension, each aforementioned electrical connection box separates a predetermined interval, and may be arranged.

[0010] The stop receptacle section and the stop section are prepared in each aforementioned electrical connection box, and the stop section of the electrical connection box of another side is stopped in the stop receptacle section of one

electrical connection box, and where electrical connection boxes are piled up mutually, you connect.

[0011] Since two or more electrical connection boxes are electrically connected by the cable extension electrically connected with the internal cable in a main part according to the wiring contact concerning this invention, the interval between electrical connection boxes can be changed, or electrical connection boxes are piled up, and it can adjust.

[0012] Moreover, even if the number of the harnesses which constitute a circuit increases with a design change, the addition of a type of a car, etc., the harness for electrical connection box connection is unnecessary.

[0013]

[Embodiments of the Invention] Hereafter, the form of operation of this invention is explained, referring to a drawing. The decomposition perspective diagram and drawing 2 which show each electrical connection box which constitutes the wiring contact which drawing 1 requires for this invention The perspective diagram and drawing 3 which show an internal flat cable, an extended flat cable, and pars intermedia material The cross section in which the perspective diagram and drawing 4 (A) which show the wiring contact concerning this invention show the IV-IV line cross section of drawing 3 , and (B) shows the relation between the 1st end-connection child of an internal flat cable and a discharge ring, and (C) The cross section and drawing 5 which show the relation between the 2nd end-connection child of an internal flat cable and pars intermedia material The cross section and drawing 7 (A) which show the relation between an arm top cover, pars intermedia material, and a discharge ring It is a cross section in part. the 1- the 1st stop prepared in the 3rd electrical connection box -- a hole and the 1st height are shown -- (B) the 1- the state where the 3rd electrical connection box was connected is shown -- a part -- a cross section and drawing 8 (A) -- the 1- the 2nd stop prepared in the 3rd electrical connection box -- a hole and the 2nd height are shown -- a part -- a cross section -- it is -- (B) -- the 1- the state where the 3rd electrical connection box was connected is shown -- it is a cross section in part

[0014] As shown in drawing 1 or drawing 5 , the wiring contact concerning this invention has two or more electrical connection boxes (a drawing three) A, B, and C. Each electrical connection boxes A, B, and C are constituted identically, and have the main part 3 in the air which consists of a discharge ring 1 and an arm top cover 2, the pars intermedia material 4 of the tabular prepared in the interior of the main part 3, two internal flat cables 5 and 5 formed in the interior of a main part 3, and the extended flat cable 6 which was electrically connected to the internal flat cable 5, and was prolonged in the main part 3 shell exterior. To the same cable extension 6, each electrical connection boxes A, B, and C separate a predetermined interval in a desired position, and are arranged in it.

[0015] The 1st abbreviation rectangular parallelepiped-like lobe 1a and partition section 1c separate a predetermined interval in the wall of a discharge ring 1, and are prepared in it in parallel by turns. Moreover, there is some partition section 1c by which 5th lobe 1b is prepared in the upper part. The height 7 is formed in the both-sides wall of a discharge ring 1. Moreover, the two bottom housing sections 8 and 8 for terminals in the air are formed in the side attachment wall by the side of the transverse plane of a discharge ring 1 at a discharge ring 1 and one. The height 9 is formed in the both-sides wall of each bottom housing section 8 for terminals.

[0016] Moreover, the 1st frame part 19 of an abbreviation rectangle is formed in the outer wall front face of a discharge ring 1. one field of the 1st frame part 19 -- the 1st stop -- a hole 20 forms -- having (referring to drawing 1 , drawing 4 (A), and drawing 7 (A)) -- the field of another side -- the 2nd two stop -- holes 21 and 21 are formed (refer to drawing 1 and drawing 8 (A))

[0017] 6th fitting hole 2a (refer to drawing 5 ) is prepared in the wall of an arm top cover 2. The stop frame 10 which stops to the height 7 of a discharge ring 1 is formed in the both-sides wall of an arm top cover 2. Moreover, the two top housing sections 11 and 11 for terminals in the air are formed in the side attachment wall by the side of the transverse plane of a discharge ring 1 at an arm top cover 2 and one. The stop frame 12 which stops to the height 9 of the bottom housing section 8 for terminals is formed in the both-sides wall of each top housing section 11 for terminals.

[0018] Moreover, the 2nd frame part 22 of an abbreviation rectangle is formed in the outer wall front face of an arm top cover 1. The 2nd frame part 22 is formed with a size [ a little ] shorter than the length of the 1st frame part 19 in every direction so that it can fit into the 1st frame part 19.

[0019] one field of the 2nd frame part 22 -- the stop of the 1st of a discharge ring 2 -- the 1st height 23 stopped by the hole 20 prepares -- having (referring to drawing 1 , drawing 4 , and drawing 7 (A)) -- the field of another side -- the stop of the 2nd of a discharge ring 2 -- the 2nd two height 24 and 24 stopped by the hole 21 is formed (refer to drawing 8 (A))

[0020] The 2nd abbreviation rectangular parallelepiped-like lobe 4a and 4d of partition sections separate a predetermined interval in the upper surface of the pars intermedia material 4, and they are prepared in it in parallel by turns. Moreover, there is 4d of some partition sections by which lobe 4b of the octavus is prepared in the upper part. Lobe 4b of the octavus fits into 6th fitting hole 2a of an arm top cover 2 removable (refer to drawing 5 (A) and (B)). Moreover, 7th fitting hole 4c which fits into 5th lobe 1b of a discharge ring 1 removable is prepared in the inferior surface of tongue of the pars intermedia material 4.

[0021] The internal flat cable 5 is a cable which covered with the flexible insulating film what has arranged two or more electric wires in the shape of parallel, and was formed in the shape of flatness. The 1st end-connection child 13 and the 2nd end-connection child 14 who were connected to each electric wire are prepared in the ends of the internal flat cable 5, respectively.

[0022] As for the insulating film which covers an electric wire, it is desirable for the laminate film which consists of adhesives or thermosetting thermoplastic adhesives, and thermoplastic plastic film to be used, and to use a polyethylene terephthalate (PET), a polyimide (PI), polyether naphthalate (PEN), etc. as a material of plastic film.

[0023] every of the internal flat cable 5 -- as shown in drawing 4 (A) and (B), 3rd fitting hole 13a which fits into 1st lobe 1a of a discharge ring 1 removable is prepared for the 1st end-connection child 13 3rd fitting hole 13a bends for example, a board member in the shape of a cross-section abbreviation KO character, processes it, and is formed.

[0024] every of the internal flat cable 5 -- as shown in drawing 4 (A) and (C), 4th fitting hole 14a which fits into 2nd lobe 4a of the pars intermedia material 4 removable is prepared for the 2nd end-connection child 14 4th fitting hole 14a bends for example, a board member in the shape of a cross-section abbreviation KO character, processes it, and is formed.

[0025] In addition, as for the 1st lobe 1a of a discharge ring 1, and 2nd lobe 4a of the pars intermedia material 4, being formed a little in a taper is desirable so that it may be easy to insert in 3rd fitting hole 13a and 4th fitting hole 14a.

[0026] Two internal flat cables 5 and 5 have been arranged in the state where it turned up on both sides of the pars intermedia material 4 in between, and they have aligned in two steps so that the 1st end-connection child 13 and the 2nd end-connection child 14 may become the same direction (the direction of a transverse-plane side) (refer to drawing 1 or drawing 3 ).

[0027] The extended flat cable 6 is a cable which is constituted identically to the internal flat cable 5, covered with the flexible insulating film what has arranged two or more electric wires in the shape of parallel, and was formed in the shape of flatness. The extended flat cable 6 is connected with the bottom portion of the internal flat cable 5 turned up within the main part 3.

[0028] Drawing 6 is explanatory drawing showing roughly the connection state of the internal flat cable 5 in a main part 3, and the extended flat cable 6. The electric wire of the internal flat cable 5 and the alternate long and short dash line 16 of an alternate long and short dash line 15 are electric wires of the extended flat cable 6 among drawing 6 . The extended flat cable 6 is put on the upper part of two internal flat cables 5 in a main part 3 in the abbreviation right-angled direction, and each electric wires 15 and 16 are arranged on a matrix. The electric wire 16 of the extended flat cable 6 and the electric wire 15 of the internal flat cable 5 in a main part 3 are electrically connected using the conductive connection material 17. As connection material 17, it thrusts and the connection material of a mold etc. is used, for example. In addition, you may connect between an electric wire 15 and 16 by resistance welding, ultrasonic welding, etc.

[0029] Next, an example of the assembly method of each electrical connection box which constitutes the wiring contact concerning this invention is explained.

[0030] First, the extended flat cable 6 is laid on top of the internal flat cable 5 in a main part 3, and between an electric wire 15 and 16 is suitably connected electrically by the connection material 17, various welding, etc.

[0031] subsequently, every of two internal flat cables 5 -- 1st lobe 1a in a position [ discharge ring / 1 / in 3rd / of the 1st end-connection child 13 / fitting hole 13a ] is fitted in

[0032] Subsequently, the pars intermedia material 4 is arranged in the upper part of the 1st end-connection child 13 of the internal flat cable 5, and 5th lobe 1b in a position [ discharge ring / 1 / in 7th / of the pars intermedia material 4 / fitting hole 4c ] is fitted in.

[0033] subsequently, the abbreviation interstitial segment of the internal flat cable 5 -- turning up -- every -- 2nd lobe 4a in a position [ material / pars intermedia / 4 / in 4th / of the 2nd end-connection child 14 / fitting hole 14a ] is fitted in

[0034] Subsequently, the electrical connection box which consists of a main part 3 and housing 18 for terminals completes the stop frame 10 of an arm top cover 2, and the stop frame 12 of the top housing section 11 for terminals by stopping, respectively to the height 7 with a discharge ring 1, and the height 9 of the bottom housing section 8 for terminals.

[0035] With the gestalt of operation of this invention, to the extended flat cable 6, a predetermined interval is separated in a desired position and three electrical connection boxes A, B, and C are attached in it. In that case, about the electrical connection boxes A and C, an arm top cover 2 is attached in the extended flat cable 6 bottom, and a discharge ring 1 is attached in the bottom. About the electrical connection box B, in order to make it reversed and to pile up on the electrical connection box C, a discharge ring 1 is attached in the extended flat cable 6 bottom, and an arm top cover 2 is attached in the bottom.

[0036] Next, the superposition process of the electrical connection boxes A, B, and C is explained. First, the electrical connection box B is reversed to the electronic joint box C side by using the interstitial segment of the extended flat cable 6 between the electrical connection box B and the electrical connection box C as the supporting point, and the 2nd frame part 22 of the electrical connection box C is fitted in in the 1st frame part 19 of the electrical connection box B. that time -- the 1st stop of the electrical connection box B -- a hole 20 -- the 1st height 23 of the electronic joint box C -- stopping (referring to drawing 7 (B)) -- the 2nd two stop of the electrical connection box B -- a hole 21 is stopped to the 2nd two height 24 of the electronic joint box C (refer to drawing 8 (B))

[0037] Subsequently, the interstitial segment of the extended flat cable 6 between the electrical connection box B and the electrical connection box A is bent up, the electrical connection box A is brought near by the electronic joint box B side, and the 2nd frame part 22 of the electrical connection box B is fitted in in the 1st frame part 19 of the electrical connection box A. that time -- the 1st stop of the electrical connection box A -- a hole 20 -- the 1st height 23 of the electrical connection box B -- stopping (referring to drawing 7 (B)) -- the 2nd two stop of the electrical connection box A -- a hole 21 is stopped to the 2nd height 24 of the electrical connection box B (refer to drawing 8 (B))

[0038] The electrical connection boxes A, B, and C are connected in the state where it lapped mutually by this, and the wiring contact concerning this invention is completed (refer to drawing 3 ).

[0039] In addition, fixation in the 1st end-connection child's 13 discharge ring 1 and fixation in the 2nd end-connection child's 14 pars intermedia material 4 are changed into the state of temporary fixation in the case of assembly operation, and it is desirable on working efficiency to fix completely by package with the lock of an arm top cover 2 and a discharge ring 1.

[0040] Moreover, in not maintaining a continuity check etc. after that, it welds an arm top cover 2 and a discharge ring 1.

[0041] Since two or more electrical connection boxes are electrically connected with the extended flat cable 6 electrically connected with the internal flat cable 5 in a main part 3 according to the wiring contact concerning this invention, the interval between electrical connection boxes can be changed, or electrical connection boxes are piled up, and it can adjust. Even if it is the case where it changes into complicated circuitry, it becomes unnecessary consequently, to be able to respond using the existing electrical connection box and to newly develop an electrical connection box.

[0042] Moreover, since the harness for electrical connection box connection is unnecessary even if the number of the harnesses which constitute a circuit increases with a design change, the addition of a type of a car, etc., composition becomes easy and can cut down a manufacturing cost.

[0043] Moreover, since it is not necessary to perform the laminating of a bus bar and an end-connection child can be fixed by package with the lock of an arm top cover 2 and a discharge ring 1, the number of assemblers decreases. Consequently, assembly-operation time can be shortened.

[0044] Moreover, since a discharge ring 1, the pars intermedia material 4, the internal flat cable 5, and an arm top cover 2 are only piled up, assembly operation is easy. Consequently, it is possible to assemble an electrical connection box in large quantities and efficiently using an automatic assembly machine, a robot, etc.

[0045] Moreover, since it is not necessary to prepare a connector area in a flank if the terminal housing 18 can be constituted from a main part 3 and one and the cable extension 6 is used, part mark can be lessened.

[0046] Moreover, since the cable is used, compared with the case where a bus bar is used, it can respond flexibly to the design change of a circuit, and a manufacturing cost can be made cheap.

[0047] Moreover, since what is necessary is just to make the lobe of a main part 3 or the pars intermedia material 4 secede from the fitting hole of a cable when maintaining a continuity check etc., compared with the case where the lance section is used, the sampling of a cable is easy.

[0048] Various change is possible for this invention within the limits of the technical matter which was not limited to the form of the above-mentioned implementation and was indicated by the claim.

[0049] Although the wiring contact concerning the form of operation of this invention has three electrical connection boxes, it may have two or four or more electrical connection boxes.

[0050] Moreover, you may connect two or more electrical connection boxes electrically through the different cable extension.

[0051] moreover, the 1st stop -- a hole 20 and the 2nd stop -- the number of a hole 21, the 1st height 23, and the 2nd heights 24, a position, and a configuration are instantiation, are not limited to what is indicated by the specification and the drawing, but are changed suitably

[0052] Moreover, you may use cables other than a flat cable as the cable and the cable extension in a main part 3.

[0053] Moreover, since it has a relative relation, it may be made the case of the form of the above-mentioned operation, and reverse, and the 1st - the 8th lobe, and fitting hole which fit in mutually may be prepared. Namely, use

1st lobe 1a as a fitting hole, and 2nd lobe 4a is used as a fitting hole. 3rd fitting hole 13a may be made into a lobe, 4th fitting hole 14a may be made into a lobe, 5th lobe 1b may be used as a fitting hole, 6th fitting hole 2a may be made into a lobe, 7th fitting hole 4c may be made into a lobe, and 8th lobe 4b may be used as a fitting hole.

[0054] Furthermore, an end-connection child may be prepared only in one edge of the internal flat cable 5, and the end-connection child may be fixed to one covering 1 of one of the upper and lower sides (2) without forming the pars intermedia material 4.

[0055] Various change is possible for this invention within the limits of the technical matter which was not limited to the gestalt of the above-mentioned implementation and was indicated by the claim.

[0056]

[Effect of the Invention] Since two or more electrical connection boxes are electrically connected by the cable extension electrically connected with the internal cable in a main part according to the wiring contact concerning this invention, the interval between electrical connection boxes can be changed, or electrical connection boxes are piled up, and it can adjust. Even if it is the case where it changes into complicated circuitry, it becomes unnecessary consequently, to be able to respond using the existing electrical connection box and to newly develop an electrical connection box.

[0057] Moreover, since the harness for electrical connection box connection is unnecessary even if the number of the harnesses which constitute a circuit increases with a design change, the addition of a type of a car, etc., composition becomes easy and can cut down a manufacturing cost.

---

[Translation done.]

\* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

---

CLAIMS

---

[Claim(s)]

[Claim 1] The wiring contact characterized by being prepared in the interior of a main part and a main part in the air, connecting with the internal cable equipped with the end-connection child at the nose of cam, and its internal cable electrically, having two or more electrical connection boxes which have the cable extension prolonged in the aforementioned main part shell exterior, and the aforementioned electrical connection boxes being electrically connected by the aforementioned cable extension.

[Claim 2] Each aforementioned electrical connection box is a wiring contact according to claim 1 characterized by separating a predetermined interval and being arranged to the same cable extension.

[Claim 3] The wiring contact according to claim 1 or 2 characterized by the ability to connect [ to be able to prepare the stop receptacle section and the stop section in each aforementioned electrical connection box, to be able to stop the stop section of the electrical connection box of another side in the stop receptacle section of one electrical connection box, and ] where electrical connection boxes are piled up mutually.

---

[Translation done.]



## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DESCRIPTION OF DRAWINGS

## [Brief Description of the Drawings]

[Drawing 1] It is the decomposition perspective diagram showing each electrical connection box which constitutes the wiring contact concerning this invention.

[Drawing 2] It is the perspective diagram showing an internal flat cable, an extended flat cable, and pars intermedia material.

[Drawing 3] It is the perspective diagram showing the wiring contact concerning this invention.

[Drawing 4] The cross section in which (A) shows the IV-IV line cross section of drawing 3 , and (B) shows the relation between the 1st end-connection child of an internal flat cable and a discharge ring, and (C) are the cross sections showing the relation between the 2nd end-connection child of an internal flat cable, and pars intermedia material.

[Drawing 5] It is the cross section showing the relation between an arm top cover, pars intermedia material, and a discharge ring.

[Drawing 6] It is explanatory drawing showing roughly the connection state of the internal flat cable in a main part, and an extended flat cable.

[Drawing 7] (A) -- the 1- the 1st stop prepared in the 3rd electrical connection box -- a hole and the 1st height are shown -- a part -- a cross section -- it is -- (B) -- the 1- the state where the 3rd electrical connection box was connected is shown -- it is a cross section in part

[Drawing 8] (A) -- the 1- the 2nd stop prepared in the 3rd electrical connection box -- a hole and the 2nd height are shown -- a part -- a cross section -- it is -- (B) -- the 1- the state where the 3rd electrical connection box was connected is shown -- it is a cross section in part

[Drawing 9] It is the perspective diagram showing the state where the external connector of two or more harnesses is inserted into terminal housing of the conventional electrical connection box.

[Drawing 10] It is the perspective diagram showing the case where the number of the harnesses which constitute a circuit increased and another electrical connection box is added.

## [Description of Notations]

A, B, C: Electrical connection box

1: Discharge ring

2: Arm top cover

3: Main part

4: Pars intermedia material

5: Internal flat cable

6: An extended flat cable

7: Height

8: The bottom housing section for terminals

9: Height

10: Stop frame

11: The top housing section for terminals

12: Stop frame

13: The 1st end-connection child

14: The 2nd end-connection child

15 16: Electric wire

17: Connection material

18: Terminal housing

- 19: The 1st frame part
- 20: the 1st stop -- a hole
- 21: the 2nd stop -- a hole
- 22: The 2nd frame part
- 23: The 1st height
- 24: The 2nd height

---

[Translation done.]

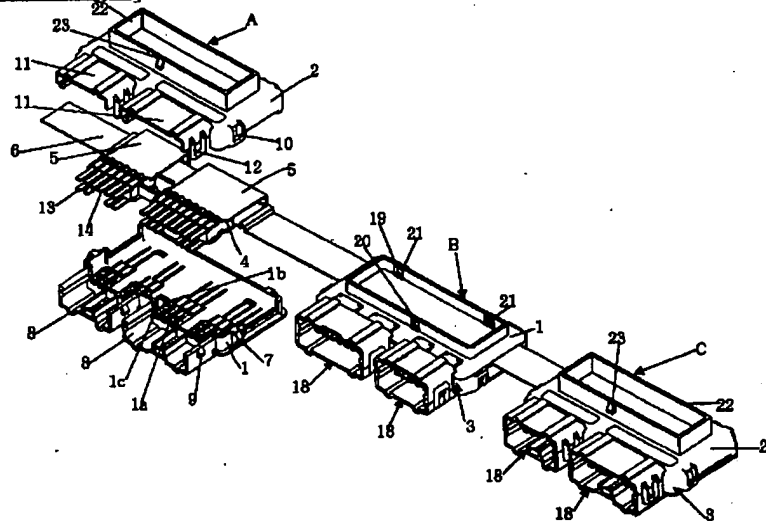
## \* NOTICES \*

Japan Patent Office is not responsible for any damages caused by the use of this translation.

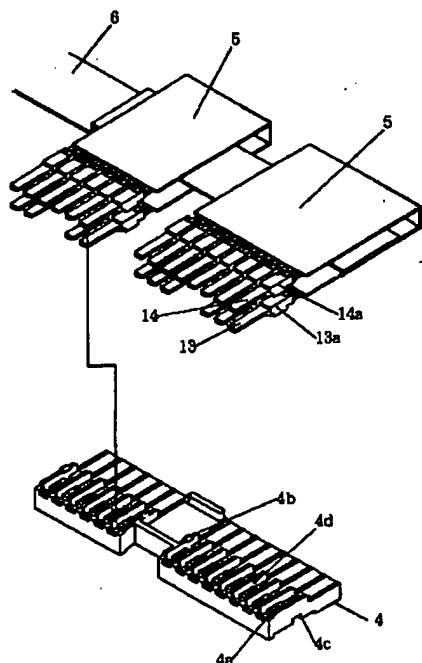
1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

## DRAWINGS

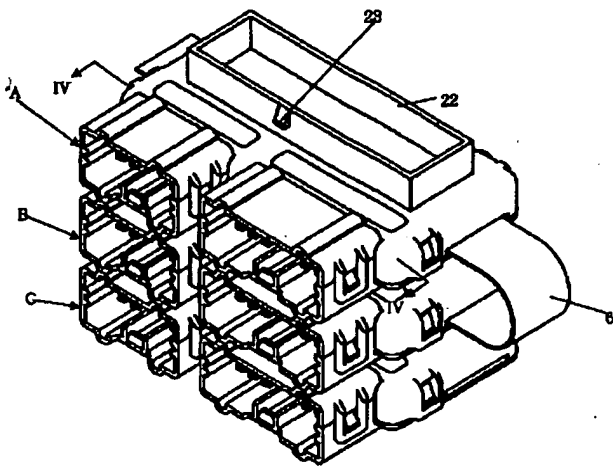
[Drawing 1]



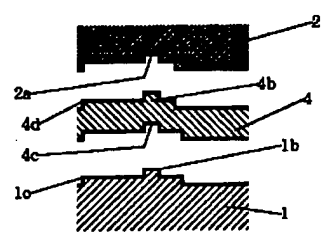
[Drawing 2]



[Drawing 3]



[Drawing 5]

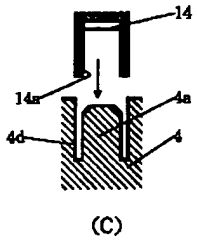
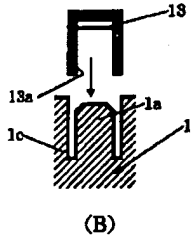
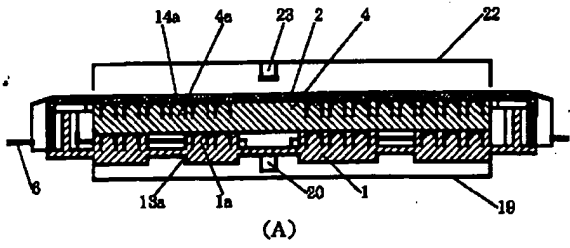


(A)

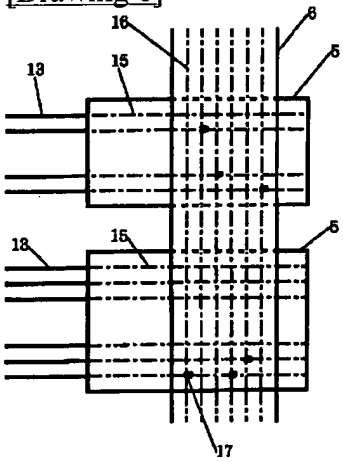


(B)

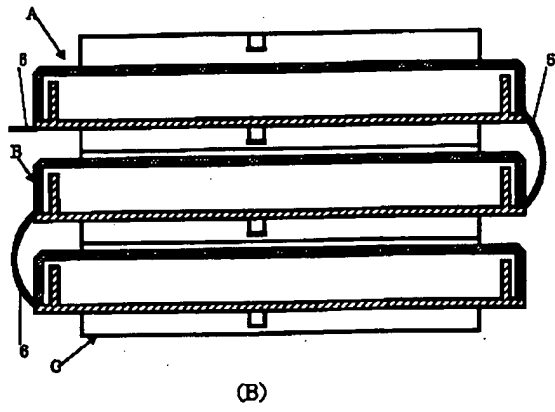
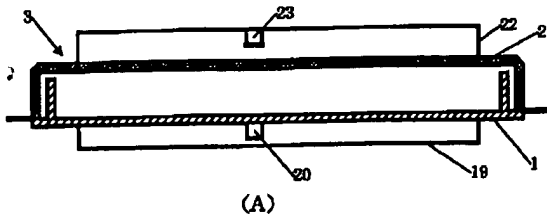
[Drawing 4]



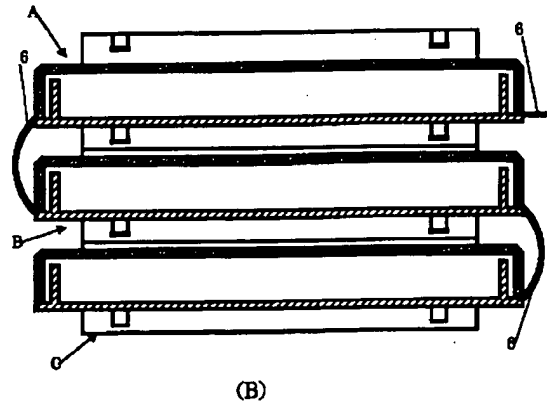
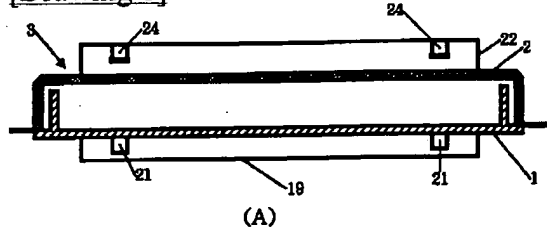
[Drawing 6]



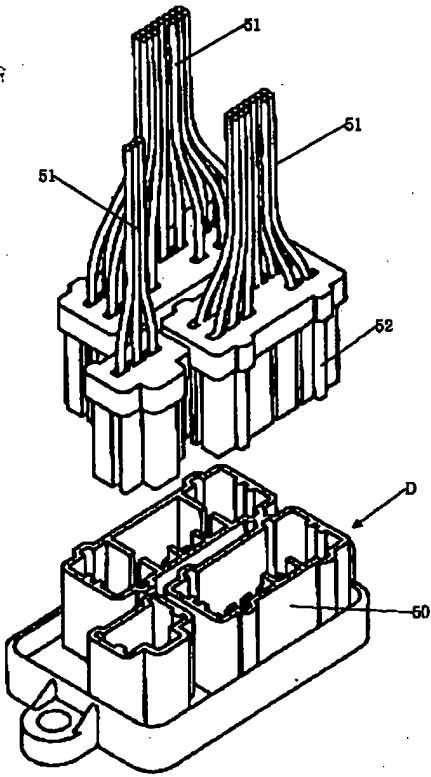
[Drawing 7]



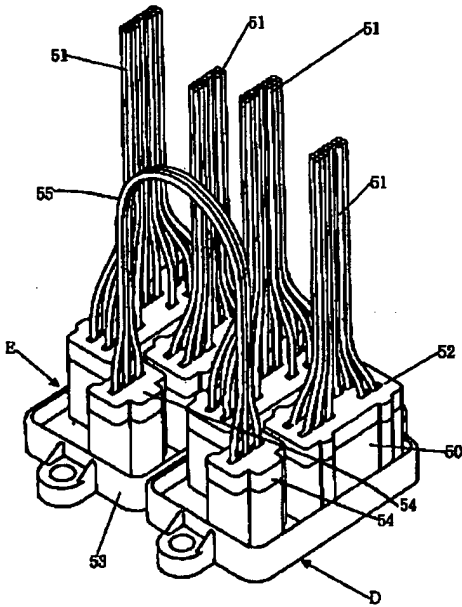
[Drawing 8]



[Drawing 9]



[Drawing 10]



---

[Translation done.]